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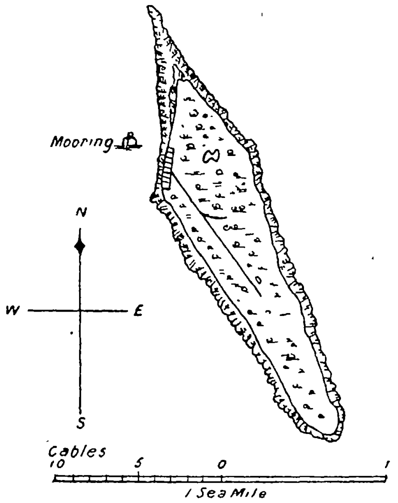
It is now leased to Levers' Pacific Plantations Company.

The winds are almost constantly from the eastward, but squalls, accompanied by light rain, occur in the neighbourhood all the year round. The wind is variable from January to May, during which period bad weather is most common.



Flint Island.

Flint Island (British), discovered in 1801, is 13 feet high, covered with brushwood and trees, and is visible from the masthead from a distance of 16 miles. It is about 2½ miles long N.N.W. and S.S.E., half a mile wide, and is fringed by a steep coral reef which dries at low water, and extends seaward generally about half a cable, but off the northern end of the island it extends seaward 4½ cables, and off the southern end E.S.E. 2½ cables. In the interior are two small lagoons of brackish water.

In 1880 October the island was uninhabited, and the buoys formerly in use were gone.

It is now leased to Levers' Pacific Plantations Company.

There is little or no rise and fall of tide at Flint Island.

The landing is very bad even for surf-boats, but it is said to export nearly 200 tons of copra annually.

Preliminary Account of Flash Spectra taken 1905 *August* 30.

By S. A. Mitchell, Ph.D.

Upon the invitation of Admiral Chester, Superintendent of the U.S. Naval Observatory, the writer became a member of the United States expedition to observe the total eclipse of the Sun. The party crossed the Atlantic in the three men-of-war, U.S.S, "Minneapolis," U.S.S. "Cæsar," and U.S.S. "Dixie."

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Observations were made at three stations, one in Africa, near the central line at Guelma, the other two in Spain, of which one was an edge station at Puerto Coeli, and the second near the centre of the Moon's shadow path at Daroca. All three stations were fortunate in having perfect weather conditions.

At Daroca were located Professor Eichelberger and Mr. Yowell, of the Naval Observatory; Professor Bigelow, of the U.S. Weather Bureau; Mr. Hoxton, of the Johns Hopkins University; and the writer. The programme of work included :—

A. Meteorological Observations, Professor Bigelow.
B. Photographs of Corona with 40-ft. horizontal camera, Mr. Hoxton.
C. Photographs of Corona with
  (*a*) 104 in. } Mr. Yowell.
  (*b*) 36 in. (5 in. aperture) } Mr. Yowell.
D. Spectroscopic work, Dr. Mitchell.

Five spectrographs were employed, three being grating instruments, the other two alike having a dispersion of one weak prism.

The results of the photographs are as follows :—

1. *Parabolic Grating.*—This spectrograph was used without a slit, and consisted of a Rowland grating—ruled, however, on a parabolic surface instead of on the usual concave—and a photographic plate. It was placed horizontally, and a light was fed to it by a transit of *Venus* cœlostat, which, however, did not work with the highest degree of precision. The grating was four inches in diameter, with 14,438 lines to an inch and a focal length of five feet. The exposures were made by Ensign A. G. Howe, U.S.N., of the "Minneapolis." The spectrum was exceedingly bright in the first order on one side, and definition was splendid. The flash extends from D_3 at the end of the long wave-lengths to λ 3300 in the ultra-violet.

The dispersion is practically the same as the three prism spectrographs of the Lick and Yerkes Observatories, so that the distance from D_3 to H is almost exactly seven inches, the total length of the photographed spectrum being 9·5 inches. The lines of the flash have not been counted, but they are probably more than 1500 in number. As the definition is excellent throughout and the spectrum is "normal" it is probable that wave-lengths will be determined with a high degree of accuracy.

The spectrum taken near mid-totality shows some interesting coronal rings. The ring in the green due to "coronium" is very plain, and besides there are two rings in the extreme ultra violet which are just as prominent on the photograph as the green ring. As the photographic action of the plate used is about as intense in the green as in the ultra-violet (λ 3400), where the sensitiveness falls off very quickly, it would seem that the corona is very rich in ultra-violet rays. The following lines are seen in the corona at wave-lengths which are approximately λλ 3381, 3388,

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3455, 3643, 3984, 4228, 4565, 4618, and the "coronium" line at λ 5303.

2. *Flat grating*, with 15,000 lines per inch and a ruled surface of $3\frac{1}{2} \times 6$ inches. This was used with a Clark 5-inch visual lens of 6 feet focus, and was employed without a slit. The instrument placed horizontally in connection with a Gaertner cœlostat was used on the eclipse day by Dr. Mitchell, assisted by two sailors of the U.S.S. "Minneapolis." On the photograph the distance from D_3 to H is eight inches. In the flash spectrum lines can be seen beyond the D lines toward the red almost to C. This is the end of the spectrum most desired with this instrument, and the focus is excellent from F to the extreme of the red. The green "coronium" ring also appears on the plates taken near mid-totality.

3. *Short focus concave grating* with a ruled surface of 4×6 inches, with 3610 lines per inch, and a radius of curvature of 64 inches (focus 32 inches). On account of its small dispersion, the spectra were excessively bright, and it was intended to record the changes in the bright lines just before and just after totality by photographing the second and third orders of spectra on the same plate, and making a number of exposures in quick succession at second and third contacts, the times of exposures being recorded on the chronograph. This instrument was in charge of Ensign F. McCommon, U.S.N. However, as totality began about ten seconds before calculated time, the exposures at second contact which were to run on both sides of the "flash" were all inside totality. In addition, the chronograph pen failed to write, and, as no one was watching it, this was unnoticed till totality was over.

4. *Two prismatic spectrographs* of the same dispersion were used in an attempt to find the intensity of the corona in different parts of the spectrum. This was to be done by photographing on the same plate, above and below the corona, comparison spectra of the Sun taken under ordinary conditions and with different exposures. Photometric measures could then have been made.

The Smithsonian Institution bolometric determinations give the energy of the Sun in different parts of the spectrum. If these eclipse photographs had been successful the energy of the corona at different regions would have become known. The instruments were used with slits, and each consisted of one prism with the necessary collimator and objective. No photometric measures were possible, for the reason that the coronal spectra were very faint, caused no doubt by the plate being slightly fogged from the diffused light in taking the comparison spectra.

Columbia University, New York City:
1906 *February* 13.

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Note on Mr. Reynolds's Dark-slides. By A. E. Conrady.

At the suggestion of Professor Turner I have collected all available information concerning the above in the hope that it may prove useful in future.

It appears that these slides were made from a log of Spanish mahogany originally cut into boards fifteen years ago, the wood having been kept by the makers of these slides for the last nine years, and used in the making of a large number of slides, none of which have ever shown any sign of fogging plates excepting those taken to Egypt by Mr. Reynolds.

When the slides were returned to the makers, plates were inserted, and the slides kept in a dark-room for about a week, when on development the plates were found decidedly fogged, excepting where a strip of tinfoil had been interposed between the wood and the film. It is thus evident that the slides were then capable of fogging plates even at a comparatively low temperature, and the experiment further showed that, whatever the emanation or radiation might be, it was incapable of acting through tinfoil. Unfortunately it was found quite impossible permanently to fasten tinfoil inside the shutters, but it was found that a heavy coating of the usual optical black, that is to say, essentially a mixture of shellac and lamp-black, also stopped the action entirely, and this was the method by which the slides were put right.

It must still remain an open question what caused these particular slides to acquire the undesirable peculiarity; possibly exposure to the extreme heat and dryness of Central Egypt may have had something to do with it, as it is certainly a fact that out of the large number of dark-slides made from this particular log Mr. Reynolds's slides were the only ones to show this property.

It would indeed seem advisable, when slides are to be used in the taking of photographs which cannot be replaced afterwards, severely to test them before use under as nearly as possible the conditions which they will have to face in the actual work.

I may add that these particular slides were not newly made for the eclipse; on the contrary they were manufactured two and a half years before, and had been in stock ever since.

Note on certain Anomalies observed in Radial Velocity Curves.

By Alex. W. Roberts, D.Sc.

Those whose researches lead them in one direction of an inquiry regarding the causes which underlie short-period variation must be impressed, as well as oppressed, with the great area of uncertainty which surrounds the whole subject.